CLAIMS

1. A method of treating a volume of biological tissue by localized hyperthermia, the device including a plurality of active percutaneous electrodes (1-N), at least one return electrode (120), and a high frequency electricity generator (100) suitable for applying an alternating voltage between the active electrodes (1-N) and the return electrode (120), the device being characterized in that the generator (100) is suitable for feeding each active electrode (1-N) independently of the others, such that the parameters of the voltage applied to each active electrode can be adjusted in independent manner.

2. A device according to claim 1, characterized in that the electricity generator (100) includes means (20) for adjusting the amplitude and the phase of the voltage applied to each active electrode (1-N).

3. A device according to claim 2, characterized in that the generator is suitable for applying voltages to two active electrodes i and j that present respective amplitudes V_i and V_j with a phase difference Φ_{ij} between the voltages that is equal to:

$$\Phi_{ij} = a\cos\left(\frac{V_i^2 + V_j^2 - \Delta^2}{2V_i \cdot V_j}\right), \quad \Delta \in \left[\left|V_j - V_i\right|, V_i + V_j\right]$$

where Δ is a desired potential difference between the electrodes i and j, and V_i is the amplitude of the potential difference between the i^{the} electrode and the return electrode.

4. A device according to any preceding claim, characterized in that the electricity generator (100) is a multichannel voltage generator.

5. A device according to any preceding claim, characterized in that the generator (100) includes a set

of manually or automatically controlled switches (60), the switches being suitable for independently activating or deactivating feed to one or more electrodes.

6. A device according to any preceding claim, characterized in that it includes a plurality of active electrodes (1-N) disposed at equal distances from a percutaneous return electrode (120).

7. A device according to any preceding claim, characterized in that it has an even number of active electrodes (N = 2.p, for integer p).

8. A device according to claims 6 and 7, characterized in that it has six active electrodes (1-6) distributed in uniform manner in a cylindrical configuration, the return electrode being disposed at the center of the cylinder.

9. A device according to any one of claims 6, 7, and 8, characterized in that the generator (100) is suitable for providing feed voltages presenting phase differences that alternate between consecutive pairs of electrodes.

10. A device according to claim 6 or claim 7, characterized in that the generator (100) is suitable for supplying feed voltages presenting equal phase differences between successive pairs of electrodes.

11. A device according to any preceding claim, characterized in that it includes an additional, external return electrode (11), in particular in the form of a cutaneous conductive plate.

12. A device according to any preceding claim, characterized in that it includes means for measuring impedance between electrodes and/or means for taking local temperature measurements, and means for controlling

the applied voltages as a function of the impedance and/or temperature measurements taken.

13. A method of treating a volume of biological tissue by localized hyperthermia, the method comprising the steps consisting in:

· positioning a plurality of active percutaneous electrodes (1-N) and at least one return electrode (120) in the tissue to be treated; and

· applying an alternating voltage between the active electrodes (1-N) and the return electrode (120) by means of a high frequency electricity generator (100);

the method being characterized in that for each active electrode (1-N) being fed independently of the others, the method also comprises the step consisting in adjusting the parameters of the voltage applied to each active electrode (1-N).

14. A method according to claim 13, characterized in that the active electrodes (1-N) are disposed in a cylindrical configuration around the percutaneous return electrode (120).

15. A method according to claim 14, characterized in that six active electrodes (1-6) are distributed uniformly around a cylindrical configuration, the return electrode (120) being disposed in the center of the cylinder.

16. A method according to any one of claims 13 to 15, characterized in that the step consisting in adjusting the parameters of the voltage applied to each active electrode (1-N) includes independently activating and deactivating the feed to one or more electrodes.

17. A method according to any one of claims 13 to 16, characterized in that the step that consists in adjusting the parameters of the voltage applied to each active

electrode (1-N) comprises determining and setting the amplitudes V_i and/or the phases Φ_i of the voltages applied to the electrodes.

18. A method according to claim 17, characterized in that the phases Φ_i of the voltages applied to the electrodes (1-N) are determined in application of the steps consisting in:

· defining, for two electrodes i and j, amplitude values V_i and V_j for the voltages that are applied respectively thereto, and also defining a potential difference Δ that is desired between the electrodes i and j; and

· deducing therefrom a phase difference Φ_{ij} between the voltages applied to the electrodes i and j in application of the following relationship:

$$\Phi_{ij} = a\cos\left(\frac{V_i^2 + V_j^2 - \Delta^2}{2V_i \cdot V_j}\right), \text{with } \Delta \in \left[\left|V_j - V_i\right|, V_i + V_j\right]$$

19. A method according to claim 17, characterized in that the active electrodes (1-N) are disposed in a cylindrical configuration around the return electrode, and the generator (100) is controlled to deliver feed voltages presenting alternating phase differences between consecutive pairs of electrodes.

20. A method according to claim 17, characterized in that the active electrodes (1-N) are disposed in a cylindrical configuration around the return electrode, and the generator (100) is controlled to supply feed voltages presenting equal phase differences between successive pairs of electrodes.